

various species of *Paradoxornis* are used.

Catamblyrhynchus has evolved a key adaptation that has not led to subsequent radiation, yet in the paradoxornithines an apparently similar adaptation has given rise to a fairly large radiation of species, some with modifications of the bill that depart rather significantly from the *Catamblyrhynchus* type. Thus, within the paradoxornithines, the full extent of morphological divergence and radiation needs to be explored to ascertain which forms are primitive and which may secondarily have evolved further specializations.

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Recent work on the origin and suppression of bird species in the Cape Verde Islands, especially the shearwaters, the herons, the kites and the sparrows

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When Charles Darwin visited the Cape Verde Islands in January 1832 at the beginning of his voyage in H.M.S. *Beagle*, he collected 2 sparrows, one of which appears to be native to the islands, and the other a recent arrival from the north. When he later began to speculate about the remarkable wildlife of the Galapagos, where sparrows are replaced by an array of endemic finches, he compared the Galapagos with the geographically similar but biologically less remarkable North Atlantic islands (especially Madeira and Bermuda, which were better known), and concluded that the peculiar features of the Galapagos must be due to their greater isolation, since variation is likely to be suppressed at accessible sites by the continual immigration of mainland forms (Darwin 1861).

Although it is now known that a number of remarkable endemic forms have been lost from the Atlantic Islands following the arrival of man, as recently reported by Pieper (1985) for Madeira, Darwin's main conclusions still appear

to hold. Since I failed to deal with his points adequately in my previous discussions of the birds of the Cape Verde Islands (Bourne 1955a, b, c, 1957, 1966), which unfortunately are not summarised very accurately by the Bannermans (1968), it may be useful to consider them in the course of a summary of recent work on the birds of the islands. Thanks to assistance from Denis Summers-Smith it is now possible to extend the Bannermans' chronological list of past contributions to Cape Verde Islands' avifauna (p. xxv-xxxi).

Naurois, R. de (1969a). A valuable summary of observations during an extended exploration of the group in the 1960s, already communicated to the Bannermans, followed by a supplement (1984), and a series of notes on individual species, including the Greater Flamingo *Phoenicopterus ruber* (1969b), Peregrine *Falco peregrinus madens* (1969c, 1970), Buzzard *Buteo buteo bannermani* (1973), Kite *Milvus (milvus) fasciicauda* (1972), Moorhen *Gallinula chloropus* (1968), Little Egret *Egretta garzetta* (1982a), Barn Owl *Tyto alba detorta* (1982b), Grey-headed Kingfisher *Halcyon leucocephala actaeon* (1983) and Brown-necked Raven *Corvus ruficollis* (1981).

Norrevang, A. & den Hartog, J. C. (1983). Ornithological observations during brief visits with a marine biological expedition to 9 of the islands in June 1982, only missing Maio, Sal, Branco and the Rhombos islets. Supposed Buzzards were reported on Fogo and for the first time on Brava, where the Osprey *Pandion haliaetus* and possibly House Martins *Delichon urbica* were breeding, the Spanish Sparrow *Passer hispaniolensis* had reappeared, and a pallid Swift *Apus pallidus* was seen.

Summers-Smith, D. (1984a, b, c). A report on brief visits to S. Antao, S. Vicente, S. Tiago and Fogo in October 1983. The Bar-tailed Godwit *Limosa lapponica* was reported for the first time; the author reports that the first record of *Halcyon leucocephala* for S. Vicente (1984a: Table 1) is a misprint for Fogo. The specific status and ecology of the sparrows *Passer* sp. are discussed by the author in separate notes.

Anon. (1985). A summary of observations important for conservation during the first 2 of a continuing series of guided tours in a yacht in February and March 1985. The Magnificent Frigate-bird *Fregata magnificens* and local race of the Purple Heron *Ardea purpurea bournei* were found to survive, and the endemic Raso Lark *Alauda razae* still had a population of 150-200 birds despite the recent droughts.

Norrevang, A. & den Hartog, J. C. (1983). Ornithological observations during brief visits with a marine biological expedition to 9 of the islands in June 1982, only missing Maio, Sal, Branco and the Rhombos islets. Supposed Buzzards were reported on Fogo and for the first time on Brava, where the Osprey *Pandion haliaetus* and possibly House Martins *Delichon urbica* were breeding, the Spanish Sparrow *Passer hispaniolensis* had reappeared, and a pallid Swift *Apus pallidus* was seen.

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NOTES ON SPECIES

CORY'S SHEARWATER *Calonectris diomedea edwardsi*

Norrevang & den Hartog (1984) follow Bannerman & Bannerman (1968) in treating the larger shearwater of the islands as a distinct species because it appears conspicuously smaller, and somewhat darker, notably in the bill, than the more northerly Atlantic populations. I considered this when I first described the difference (Bourne 1955b), but as reported by Murphy & Chapin (1929), the extreme forms of variation in the Atlantic are linked by overlapping intermediate populations in the Mediterranean (Table 1). Evidence continues to accumulate that the birds are all very similar in their behaviour and ecology, breeding at the same time and in the same way in the summer, when they feed on small fish driven to the sea surface by tuna (de Naurois 1969a and pers. obs.). Also it now appears that the Cape Verde birds winter south to 24°S, in comparable latitudes of the South Atlantic to their northern range, whereas the northern races occur to 48°S (Bourne & Curtis 1985).

TABLE 1

Size and proportions of races of Cory's Shearwater *Calonectris diomedea*

Race	n	Wing	Tail	Wing	Origin	n	Weight	$\sqrt{2}$ wing
				Tail				$\sqrt{3}$ weight
<i>C.d. borealis</i>	19	359	137	2.62	Salvages	52	945	3.44
<i>C.d. diomedea</i>	20	337	125	2.70	Tunisia	27	731	3.53
					Malta	15	639	3.63
					Crete	37	535	<3.82
					Cape Verde			
<i>C.d. edwardsi</i>	12	309	125	2.47	Islands (Raso)	8	483	>3.75

Notes: Approximately equal numbers of male and female skins were measured (mm) personally. Weight in g from Zino (1971), taken before incubation on the Salvages; from Jouanin (1976), taken before incubation on Zembra off Tunisia; from Round & Swann (1977), incubating birds from Malta and birds feeding young (and therefore probably light) off Crete; and from Norrevang & den Hartog (1984), mean of 6 males and 2 females before incubation (and therefore probably heavy) in the Cape Verde Islands. The scale on which the weight of these birds fluctuates seasonally is indicated by the fact that 2 healthy *C.d. borealis* which came on board a ship at 38°S, 42°W in the South Atlantic on 10 February 1985 weighed 690 and 720 g. Whereas the tail is comparatively short compared to the wing in the Mediterranean and long in the Cape Verde Islands, the wing becomes longer in proportion to the body size in the smaller forms.

LITTLE SHEARWATER *Puffinus assimilis boydi*

As in *C. diomedea*, confusion has prevailed over whether this, the smaller local shearwater, should be treated as a race of the Little Shearwater *Puffinus assimilis* of the temperate Atlantic islands, or of the tropical Audubon's Shearwater *P. lherminieri* of the West Indies, since it appears to be intermediate in many ways, not least its appearance at sea (Table 2, and pers. obs.). Its uncertain status is emphasised by the discovery that small shearwaters of unknown origin are widespread on both sides of the tropical Atlantic south of the Cape Verde Islands, where a bird resembling the Cape Verde form was found visiting St Helena in 1975-76 (Bourne & Loveridge 1978), so that it

seems possible it has a tropical distribution at sea. Since at least 18 other rather similar allopatric forms of small shearwater have now been described, all of which appear also to behave rather similarly, which could easily be considered as members of up to 6 species, the best solution may well be to follow Vaurie (1965) and combine them all into one species.

TABLE 2
Size and proportions of Atlantic allies of *Puffinus assimilis*

Race	Origin	n	Wing	Tail	Culmen	Tarsus	Toe	Wing	Wing
								tail	tarsus
<i>lherminieri</i>	West Indies	18	201	86	29.2	40.4	45.0	2.34	4.98
<i>boydi</i>	Cape Verde Is	18	186	78	25.1	37.3	41.5	2.38	4.99
<i>baroli</i>	N. Atlantic Is	15	178	70	25.2	36.9	40.9	2.54	4.82
<i>elegans</i>	Tristan-Gough	14	187	68	26.1	39.9	44.1	2.75	4.69

Notes: Measurements (mm) were made personally. It will be noted that while the birds which occur alone in the West Indies are largest, and that the birds which occur with more distantly related large shearwaters in the Cape Verde Is and the Tristan-Gough group are intermediate, that the northern populations, which also occur with the closely-related, intermediate-sized, Manx Shearwater *P. puffinus* are smallest. The tail becomes shorter but the tarsus longer in the cool water forms on both sides of the equator, implying more aquatic habits.

PURPLE HERON *Ardea purpurea bournei* and CATTLE EGRET *Bubulcus ibis*

Confusion has occurred over the status of the herons on S. Tiago. The Bannermans (1968) deduced that because I originally reported that part of the colony at San Domingos was located in rubber trees, yet they themselves later found them breeding in mangoes, that I could not distinguish between these trees. In addition, Summers-Smith (1984a) was unable to find the species at all. It is possible the birds may have moved between the time when I found them nesting in the centre of the valley, in 1951, and when the Bannermans found them nesting in a ravine in 1966; in the interval the original trees, which were rather conspicuous, may have been cut down. By 1984 the colony may have moved again, possibly because rather many birds appear to have been collected during a few years in the 1960s. Apparently the rather distinct local race of Purple Heron, which originally had several colonies, still survives (Anon. 1985), but obviously needs more protection.

KITE sp. *Milvus (milvus) fasciicauda*

I agree with Summers-Smith (1984a) that the birds seen around nest sites and foraging inland on S. Vicente, S. Tiago and Brava seemed mostly similar to Red Kites *Milvus milvus*, with contrasting markings and more rufous and white in the plumage, although they had shorter, less deeply forked tails than the nominate form; whereas those seen hawking along the shore and around ships anchored off Praia, which I assumed to be immature, appeared darker and more uniform, like Black Kites *M. migrans*. Three birds in the British Museum (Natural History) (BMNH) from S. Nicolau belong to the first type, 3 from Maio belong to the second, and a single bird from the humid island of Brava is darker than any of the others. As in the case of the Kestrel *Falco tinnunculus* (Bourne 1955c) it seems increasingly likely that there has been some hybridisation between the native stock and stray migrant Black Kites, as suggested by de Naurois (1972), and that hybridization has been commoner on the islands nearer the mainland.

GUINEA FOWL *Numida meleagris*

Frade (1976) has described the local birds, usually assumed to have been imported (although Norrevang & den Hartog (1984) point out that they were present as early as 1594), as an endemic race *N.m. bannermani*, distinguished by the possession of a short wing, at least in the male, and a greyish-fulvous instead of greyish-vinous collar compared to birds from Guinea-Bissau. Six birds from the Cape Verde Islands in the BMNH taken in November and December, when they were probably in faded plumage after breeding, certainly have pale collars compared with most from the mainland, where this character seems rather variable. Some from the mainland also have pale collars, and since the wing-length of Cape Verde birds falls within the range found on the mainland, it seems doubtful whether recognition of this race is justified.

IAGO or RUFOUS (BACKED) SPARROW *Passer iagoensis*

A number of the criteria recently advanced by Summers-Smith (1984b) for treating the local form of Rufous-backed Sparrow as a distinct species, such as the possession of a short wing, variations in pigmentation, sexual dimorphism, abundance, sociability, its ecological niche, and nest site preferences, all appear to be general phenomena among the island birds (Bourne 1955a); but his taxonomic treatment avoids a tiresome change of name.

Norrevang & den Hartog (1984) report that this was the commoner of the 2 species of sparrow seen at S. Felipe, Fogo, on 10 June 1982, whereas Summers-Smith (1984a, b, c) only found *P. hispaniolensis* there in October 1983. I was certainly informed that both species occurred there in 1951 by a witness who could demonstrably tell them apart. Since Summers-Smith (1984c) also states that nobody except Boyd Alexander (1898) has reported this species nesting in trees after I wrote that it prefers to nest "in crevices, failing crevices in trees, and failing trees on the ground under stones in the open desert" (Bourne 1955a: 549), it also seems worth repeating that I can still remember seeing in 1951 scattered nests typical for members of this genus built in the dense centres of low acacias growing in open country otherwise lacking nest sites on the southern slopes of S. Tiago, at a time when there was a large population after several years with good rains.

SPANISH SPARROW *Passer hispaniolensis*

The Spanish Sparrow, which has colonised man-made habitats in the Canary and Madeira groups, was already established on the larger eastern Cape Verde Islands by the time that naturalists arrived in the last century. By 1951 it had become common in the open central valley of the small and arid, but heavily populated, western island of S. Vicente, at which time it had, however, died out on the even smaller, but more rugged and fertile, southern island of Brava following a drought (Bourne 1955a). It first appears to have been collected on the small island of Branco in November 1970, and on the large and even more rugged westernmost island of S. Antao in November 1972 (Frade 1976), though it has as yet not been found on the latter again. By 1982 it had reappeared on Brava where I had searched and failed to find it, and was then also reported again on S. Vicente (Norrevang & den Hartog 1984). It now probably occurs in suitable places throughout the larger islands, although apparently scarcer on the more mountainous ones.

HOUSE SPARROW *Passer domesticus*

This species, which occupies a similar niche to *P. hispaniolensis* on the Azores and Bermuda, appears to have arrived before *P. hispaniolensis* in the

main port of Mindelo on S. Vicente, in the western Cape Verde Islands, between 1922 and 1924 (Bourne 1966). It has survived there ever since without spreading, despite a certain amount of hybridisation with *P. hispaniolensis* (de Naurois 1969a), possibly because, unlike the other sparrows, it may prefer to nest in the spring (Lambert 1980). Although it was not seen by Norrevang & den Hartog (1984), when they reported Spanish Sparrows there in 1982, it was found again the following year by Summers-Smith (1984a, b, c), who in turn failed to find the other species, apart from one hybrid.

DISCUSSION

In general, although a high proportion of the native birds of the Cape Verde Islands were originally described as distinct species, nearly all of them merely show an extreme degree of well-known zoogeographical trends of variation commonly found in widely distributed species, including for example a reduction in size and an increase in the proportions of the extremities in lower latitudes in the seabirds, a short wing but large bill in the landbirds, and an increase in brown pigmentation in many species (Bourne 1955a). It is often an entirely arbitrary decision whether they should be regarded as distinct species or as races.

It is notable that the groups of birds which show most variation within the islands include 2 where common migrants are now swamping small endemic populations, in one case of the same species and one of a closely allied species. Similar reactions appear to be occurring between 2 recent arrivals, as follows:—

1. The Kestrel *Falco tinnunculus* has a stepped cline running south through the Canaries and Cape Verde Islands, where in each case the birds of the easternmost islands, nearest the continent, which must receive most migrants, are closer in appearance to the mainland form; whereas the birds of the outer islands, shielded by the inner islands from reinforcement, are more distinct (Bourne 1955c, 1957, 1966).

2. The Red Kite appears to be a Pleistocene relict in the Atlantic Islands, and the Cape Verde birds must now be receiving few, if any, reinforcements of their own species from the mainland. These have been replaced by migratory Black Kites from the east, which may then have hybridised with the Red Kites of the inner islands (de Naurois 1972).

The Iago Sparrow also appears to be a Pleistocene relict, now widely separated from its declining relatives in Africa, although it has become numerous and successful in the islands. As a result of changes due to man, it appears to have been joined quite recently by the mobile Spanish Sparrow from the north, which has displaced the Iago Sparrow from the more highly developed areas without hybridising with it. In turn, the Spanish Sparrow has been replaced by a closer relation, the House Sparrow, in the centre of the most highly developed town in the group, Mindelo, on S. Vicente, where they have begun to hybridise, with results which are not yet entirely clear; it seems, though, that the House Sparrow may predominate in the town (Summers-Smith 1984a, b, c) and the Spanish Sparrow in the country (Norrevang & den Hartog 1984).

It would appear that islands may provide important refuges for birds during periods of climatic or ecological fluctuation occurring on the mainland, as for example with the Pleistocene relict species found in the Atlantic Islands. Island birds also commonly show much local geographical variation. On the other

hand, in the absence of regular contact with related species, they appear to develop few specific isolating mechanisms, and indeed those operating elsewhere appear to break down, leading to hybridisation with visitors of closely related species (which remain distinct on the mainland), as in the case of the Cape Verde Kites, and the House and Spanish Sparrows at a number of marginal islands and oases in the area where their ranges overlap. This implies that it is necessary to adopt a rather cautious policy in treating peculiar endemic insular forms as distinct species.

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Data on the distribution of some species of raptors in Bolivia

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In recent years, knowledge of the avifauna of Bolivia and its distribution has been increased by many new records providing numerous range extensions (see references). Here we present new data on the distribution and habitats of some Bolivian raptors. The specimens collected are deposited in the collection of the Estación Biológica de Doñana, Spain.

SLENDER-BILLED KITE *Rosthramus hamatus*

Recorded as a new species for Bolivia by Pearson (1975b) based on observations in the north of Beni Department. One individual was collected (EBD 6831A) at Arroyo Curiraba, c. 30 km E of San Borja, 28 Oct 1983, and another (EBD 7000A) 40 km W of San Ignacio de Mojos, 1 Nov 1983. Both localities are in SW Dpt. Beni, and correspond to flooded forest margins, in contrast to the open areas preferred by Snail Kites *R. sociabilis*, a much more abundant species in this area.

DOUBLE-TOOTHED KITE *Harpagus bidentatus*

Cited for eastern Bolivia by Bond & Meyer de Schauensee (1943), Meyer de Schauensee (1966) and Blake (1977), who make no reference to specific localities. In Dept. Beni (Tumichucua), Pearson (1975b) considered it to be rare. A female (EBD 6770A) was collected in a forest island 50 km E of San Borja (Prov. Ballivian, Dpt. Beni), 23 Oct 1983. It had a nearly completely formed egg in the oviduct, plus 3 others less well developed, besides abundant fat deposits in the abdomen. The stomach contained remains of a small rodent, a lizard and a beetle.

SHARP-SHINNED HAWK *Accipiter striatus ventralis*

This subspecies, found in subtropical and temperate Andean regions, ranges from Venezuela to Bolivia (Cochabamba) (Blake 1977). A juvenile male (EBD 6306A) was collected at Valencia (Prov. Murillo, Dept La Paz) c. 30 km south La Paz at 3000 m on 6 Mar 1983, in an area of cultivated fields and spiny